IN THE CLAIMS

Claims 11-15 are pending in this application. Please cancel claims 1-10 without prejudice or disclaimer, and add new claims 11-15 as follows:

1-10. (Canceled)

11. (New) A method for implementing a fast Fourier transformation on data array in a parallel-processing computer comprising an input apparatus, a processing apparatus that includes a plurality of processors each employing memories and a network for transferring data among the memories, an output apparatus, and an external storage apparatus, the method comprising the steps of:

dividing the data array into a plurality of data portions with the processing apparatus;

storing the plurality of data portions in said memories employed by the plurality of processors;

dividing said plurality of the data portions into a first part and a second part with the processing apparatus;

carrying out first processing which is Fourier transformation of said first part along a direction of a first axis with the processing apparatus;

carrying out second processing which is a Fourier transformation of said second part along the direction of said first axis with the processing apparatus, while relocating a result of said first processing among the plurality of processors;

performing the Fourier transformation on said relocated data along a direction of a second axis with the processing apparatus;

wherein

said first part of said data portions is even-numbered data of said data array in the direction of said second axis and

said second part of said data portions is odd-numbered data of said data array in the direction of said second axis.

12. (New) A method according to claim 11, further comprising

the step of relocating a result of the Fourier transformation of said

second part along the direction of said first axis among the plurality of processors, in parallel with the step of performing the Fourier transformation of said relocated data along the direction of the second axis.

13. (New) A method according to claim 12, further comprising the steps of:

upon completion of the step of relocating a result of the Fourier transformation of said second part along the direction of said first axis, carrying out along the direction of said second axis Fourier transformation of the relocated result of the Fourier transformation of said second part along the direction of said first axis with the processing apparatus; and

carrying out a final process of the Fourier transformation of the data array along the direction of said second axis with the processing apparatus by using both the result of the Fourier transformation of said second part along the direction of said second axis and the result of the Fourier transformation on said first part along the direction of said second axis.

14. (New) A method for implementing a three-dimensional fast Fourier transformation of a data array in a parallel-processing computer comprising an input apparatus, a processing apparatus that includes a plurality of processors each employing memories and a network for transferring data among the memories, an output apparatus, and an external storage apparatus, the method comprising the steps of:

dividing the data array into a plurality of data portions with the processing apparatus, each of the plurality of data portions being laid out on one of planes that are oriented perpendicularly to the direction of a Z axis, and arranged to form a rectangular solid having dimensions of (X, Y, Z) wherein N_X, N_Y, and N_Z are side lengths of said rectangular solid in the directions of X, Y, and Z axes, respectively;

storing the plurality of data portions in said memories employed by the plurality of processors;

carrying out transformation processing only of data elements having even-numbered X coordinate in the data array along the direction of the Y axis with the processing apparatus;

carrying out transformation processing only of data elements having odd-numbered X coordinate in the data array along the direction of the Y axis with the processing apparatus, concurrently carrying out transfer processing of the data elements having even-numbered X coordinate in the data array so that transferred data elements are divided onto each one of planes that are oriented perpendicularly to the direction of the Y axis, and each one of the divided data elements is stored into the memories employed by the plurality of processors;

carrying out first ($\log_2 N_X - 1$) steps of transformation processing only of the data elements having even-numbered X coordinate in the data array along the direction of the X axis with the processing apparatus, concurrently carrying out ~~a~~ transfer processing of the data elements having even-numbered X coordinate in the data array with the processing apparatus so that the transferred data elements are divided onto each of planes that are oriented perpendicularly to the direction of the Y axis and each of the divided data elements is stored into the memories employed by the plurality of processors;

carrying out the first ($\log_2 N_X - 1$) steps of transformation processing only of the data elements having odd-numbered X coordinate in the data array along the direction of the X axis with the processing apparatus;

carrying out a last step of the transformation processing of the data elements in the data array along the direction of the X axis by the processing apparatus; and

carrying out transformation processing of the data elements in the data array along the direction of the Z axis with the processing apparatus.

15. (New) A method for implementing a one-dimensional fast Fourier transformation on a data array having N points in a parallel-processing computer comprising an input apparatus, a processing apparatus that includes a plurality of processors each employing memories and a network for transferring data among the memories, an output apparatus, and an external storage apparatus wherein N, N_X, N_Y, and N_Z are integers and a relation $N = N_X \times N_Y \times N_Z$ is satisfied, the method comprising the steps of:

dividing the data array into data portions, each of the data portions being laid out on one of planes that are oriented perpendicularly to the direction of a Z axis, and arranged to form a rectangular solid having dimensions of {X, Y, Z} wherein N_X, N_Y, and N_Z are side lengths of said rectangular solid in the directions of a X axis, a Y axis, and the Z axis, respectively;

storing the plurality of data portions in said memories employed by the plurality of processors;

carrying out transformation processing and twist-coefficient multiplication processing only of data elements having even-numbered X coordinate in the data array along the direction of the Y axis with the processing apparatus;

carrying out transformation processing and twist-coefficient multiplication processing only of data elements having odd-numbered X coordinate in the data array along the direction of the Y axis by the processing apparatus, concurrently carrying out transfer processing of the data elements having even-numbered X coordinate in the data array with the processing apparatus so that the transferred data elements are divided onto each one of planes that are oriented perpendicularly to the direction of the Y axis, and each one of the divided data elements is stored into the memories employed by the plurality of processors;

carrying out first $(\log_2 N_X - 1)$ steps of transformation processing only of the data elements having even-numbered X coordinate in the data array along the direction of the X axis with the processing apparatus, concurrently carrying out ~~a~~ transfer processing of the data elements having even-numbered X coordinate in the data array with the processing apparatus so that the transferred data elements are divided onto each of planes that are oriented perpendicularly to the direction of the Y axis, and each of the divided data elements is stored into the memories employed by the plurality of processors;

carrying out the $(\log_2 N_X - 1)$ steps of the transformation processing only of the data elements having odd-numbered X coordinate in the data array along the direction of the X axis with the processing apparatus;

carrying out a last step of the transformation processing and twist-coefficient multiplication processing of the data elements in the data array along the direction of the X axis with the processing apparatus; and

carrying out transformation processing of the data elements in the data array along the direction of the Z axis with the processing apparatus.